(INTERMEDIATE)

PHYSICS (Academic Sessions 2018-2020 to 2020-2022)

PRACTICAL

Part - II

SPECIAL INSTRUCTIONS TO PRACTICAL EXAMINERS

Note : Special instructions for all the experiments which have been for various groups are given below. Examiners are expected to see the instruction of the relevant experiments from these sheets and evaluate the candidates strictly in the light of these instructions.

FOR BOTH SECTION – I & SECTION – II

EXPERIMENT # 01 :

SPECIFIC RESISTANCE OF A WIRE BY SLIDE WIRE BRIDGE

Performance and observations :

1. Circuit diagram (shown to examiner) 1
2. Correct connections. 2
3. Obtaining the null point and always shifting it to somewhere near the middle of the bridge wire. 1
4. Measure of length and diameter of wire. 1
5. Formula used. 1

06

Calculation and Result :

1. Calculation of resistance. 1
2. Calculation of specific resistance. 1
3. Result with unit. 2

04

Maximum Marks for 4 Obs., 80% for 3 reading, 60% for 2

EXPERIMENT # 02:

RESISTANCE OF GALVANOMETER BY HALF DEFLECTION METHOD

Performance and observations :

1. Circuit diagram (shown to examiner) 1
2. Correct connections. 1
3. Taking out suitable resistance from resistance box to get even number deflection within the scale. 2
4. Suitable resistance taken out from the shunt resistance box to make the deflection half. 2

06

Calculation and Result :

1. Calculation of (R –S) and (R × S) 2
2. Mean Internal Resistance of Galvanometer. $G = \frac{R \times S}{R - S}$ 2

04

Maximum Marks for 4 Obs., 80% for 3 and 60% for 2

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EXPERIMENT # 03 :

RESISTANCE OF GALANOMETER BY HALF DEFLECTION METHOD & ELECTRIC CURRENT FOR FULL SCALE

Performance and observations :

1.	Step (i), (ii) and (iii) as in Experiment #2	4
2.	Measurement of e.m.f. 'E' of the cell by voltmeter.	1
3.	Resistance from the main circuit resistance box to get full scale or 20 deflection in the galvanometer Rg.	1
		06

Calculation and Result :

1.	Calculation of resistance of galvanometer.	2
2.	Current required for full scale deflection $Ig = \dfrac{E}{Rg + G}$	2
		04

Maximum Marks for 4 Obs., 80% for 2 and 60% for 1

EXPERIMENT # 04 :

INTERNAL RESISTANCE OF A CELL.

Performance and observations :

1.	Circuit diagram.	1
2.	Correct connections.	2
3.	Closing K_1 and to find the balance point three times.	1
4.	Measurement of length ℓ in each case.	1
5.	Closing K_2 and to find the balance point with R = 5, 10, 15, 20, 25 Ohms or so in each case.	1
		06

Calculation and Result :

1.	Formula used.	1
2.	Calculation of internal resistance.	2
3.	Result with unit.	1
		04

Maximum Marks for 4 Obs., 80% for 3 and 60% for 2 and 40% for 1.

EXPERIMENT # 05 :

RESISTANCE OF A VOLTMETER

Performance and observations :

1.	Circuit diagram.	1
2.	Correct connections.	2
3.	Measuring EMF of cell / battery and taking it equal to maximum voltmeter reading.	1
4.	To take out R = 200 Ohms or so from R. box and to note deflection of voltmeter.	1
5.	To repeat the above step five times more by increasing R in regular steps.	1
		06

Calculation and Result :

1.	Calculation of 1/V for each obs.	1
2.	Graph between R and 1/V producing line backward and to find the resistance of voltmeter from the intercept.	2
3.	Result with unit.	1
		04

Maximum Marks for 5 Obs., 80% for 4 and 60% for 3.

EXPERIMENT # 06 :

RELATION BETWEEN THE CURRENT PASSING THROUGH A TUNGSTEN FILAMENT LAMP AND P.D APPLIED ACROSS IT.

Performance and observations :

1.	Circuit diagram.	1
2.	Correct connections.	2
3.	Reading of voltmeter and ammeter.	2
4.	Regular variation of voltage.	1

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Calculation and Result :

Item	Marks
1. Graph between V and I.	2
2. Explanation of the shape of the graph.	2
	04

Maximum Marks for 6 Obs., 80% for 5 and 60% for 4.

EXPERIMENT # 07 :

RELATION BETWEEN CURRENT AND CAPACITY , WHEN DIFFERENT CAPACITORS ARE USED IN A.C. CIRCUIT

Performance and observations :

Item	Marks
1. Circuit diagram.	1
2. Correct connections.	2
3. Noting the capacitance of a capacitor and reading of A.C. millimeter.	1
4. Repeating the experiments 5 times more with capacitors of different capacitance.	2
	06

Calculation and Result :

Item	Marks
1. Calculating I /C	1
2. Graph between I and C.	2
3. Result.	1
	04

EXPERIMENT # 08 :

STUDY THE VARIATION OF PHOTOELECTRIC CURRENT WITH INTENSITY OF LIGHT

Performance and observations :

Item	Marks
1. Circuit diagram.	1
2. Correct connections.	2
3. Noting the distance d and galvanometer deflection.	1
4. Repeating the above step by decreasing d in regular steps till d = 10 cm	2
	06

Calculation and Result :

Item	Marks
1. Calculating $1 / d^2$	1
2. Graph between $1 /d^2$ and I	2
3. Inference.	1
	04

EXPERIMENT # 09 :

TO PLOT A MAGNETIC FIELD DUE TO CURRENT IN A CIRCULAR COIL

Observations and calculations :

Item	Marks
1. Circuit diagram.	1
2. Setting the direction of the coil along the magnetic meridian by means of campass needle.	1
3. Making the connections of the coil.	2
4. Making of the magnetic lines of forces at the centre of the coil and also near the ends of the coil.	1
5. Note number of turns of coil, current I and radius of the coil.	1
	06

Calculation and Result :

Item	Marks
1. Diameter and radius of coil.	1
2. Current through coil.	1
3. Field strength and its unit formula.	1
4. Formula used.	1
	04

EXPERIMENT # 10 :

CALCULATION OF RESISTANCE OF THERMISTOR WITH TEMPERATURE.

Performance and observations :

Item	Marks
1. Circuit diagram.	1
2. Correct connections.	2
3. Record temperature in θ °C	2
4. Record for temperature in T (Kelvin)	1
	06

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Calculation and Result :

1. Graph between temperature in Kelvin along x-axis and resistance of thermistor along y-axis. 2
2. Slope of graph $\frac{\Delta R}{\Delta T}$ 1
3. Result 1

04

EXPERIMENT # 11 :

CONVERSION OF GALVANOMETER INTO AMMETER.

Performance and observations :

1. Circuit diagram. 1
2. Correct and neat tight connections. 2
3. Taking out suitable resistance for even number. 1
4. Record for half deflection. 2

06

Calculation and Result :

1. Calculation for galvanometer resistance. 1
2. Calculation for shunt resistance connection in parallel to galvanometer. 1
3. Calculation of Ig. 1
4. Verification. 1

04

EXPERIMENT # 12 :

CONVERSION OF GALVANOMETER INTO VOLTMETER

Performance and observations :

1. Circuit diagrams. 1
2. Correct ,neat and tight connections. 2
3. Taking out suitable resistance for even deflection. 1
4. Record for half deflection. 2

06

Calculation and Result :

1. Calculation for resistance of galvanometer 1
2. Calculation Ig 1
3. Calculation for high resistance connected in series with galvanometer. 1
4. Verification. 1

04

EXPERIMENT # 13 :

EMF OF CELL BY POTENTIOMETER.

Performance and observations :

1. Circuit diagram. 1
2. Correct connections. 2
3. Location of balance point. 1
4. Measurement of e.m.f. by voltmeter (E) 1
5. Formula used. 1

06

Calculation and Result :

1. Calculation of e.m.f. (Ex) 2
2. Actual value of Ex 1
3. Calculation of % error. 1

04

EXPERIMENT # 14 :

CHARACTERISTICS OF A SEMI CONDUCTOR DIODE.

Performance and observations :

1. Circuit diagrams. 1
2. Correct ,neat and tight connections. 2
3. Check zero correction for measuring instruments. 1
4. Adjustment of rheostat for minimum reading. 1
5. Record of voltage and current. 1

Calculation and Result :

1. Graph between V and I for forward biased or reversed biased. 3
2. Inference. 1

04

EXPERIMENT # 15 :

CHARACTERISTICS OF A TRANSISTOR

Performance and observations :

1. Circuit diagram. 1
2. Tight, neat and correct connections. 2
3. Check zero correction for measuring instruments. 1
4. Record 2

06

Calculation and Result :

1. Graph between V and I (input curve) 2
2. Graph between V and I (output curve) 2

04

EXPERIMENT # 16 :

VERIFY TRUTH TABLES OF BASIC LOGIC GATES $\{OR; AND; NOT\}$

Performance and observations :

1. Circuit diagram (s). 1
2. Tight, neat and correct connections. 2
3. Check the working of indicating lamp. 1
4. Write the Truth Table. (T.T) 2

06

Calculation and Result :

1. Logic operation (s). 2
2. Result (s). 2

04

EXPERIMENT # 17 :

HIGH RESISTANCE BY NEON FLASH LAMP.

Performance and observations :

1. Circuit diagram. 1
2. Neat, tight and correct connections. 2
3. Check that applied voltage should be constant and greater than striking voltage of Neon flash lamp. 1
4. Record. 2

06

Calculation and Result :

1. Graph between unknown resistance and flashing period. 2
2. Result. 2

04

EXPERIMENT # 18 :

E / M OF AN ELECTRON

Performance and observations :

1. Circuit diagram. 1
2. Correct, tight and neat connections. 2
3. Measurement of length, number of turns and radius of coin. 1
4. Measurement of curvature of edge of shadow. 1
5. Record. 1

06

Calculation and observations :

1. Calculation of e / m. 2
2. Correct value of e / m and unit. 2

04

EXPERIMENT # 19 :

SET UP BURGLAR ALARM USING 'NAND' GATE.

Performance and observations :

1. Circuit diagram. 1
2. Tight, neat and correct connections. 2
3. Check the working of Burglar alarm. 1
4. Write the observation table. 2

06

Calculation and Result. 04

EXPERIMENT # 20 :

MAKE A FIRE ALARM USING 'NOT' GATE.

Performance and observations :

1. Circuit diagram. 1
2. Tight, neat and correct connections. 2
3. Check the working of fire alarm. 1
4. Write the observation table. 2

06

Calculation and Result. 04

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PHYSICS
PRACTICAL
Part - II

(INTERMEDIATE)
(Academic Sessions 2018-2020 to 2020-2022)

GENERAL INSTRUCTIONS TO PRACTICAL EXAMINERS

The following General Procedure for conducting the Practical Examination in Physics is prescribed :

1. The Examiners must reach the laboratory at least HALF AN HOUR before the scheduled time for starting the practical examination.
2. The glass pannus of the doors and windows of the laboratory should be blinded particularly when apparatus is being set before the commencement of the examination.
3. No person other than those on duty should be present in the laboratory during the setting of the apparatus at the examination time. The number of persons engaged in the examination should be according to these prescribed by the Board and contained in the booklet ' Instructions to Examiners'. It is the entire responsibility of the Examiner to keep the laboratory Clear of unnecessary persons.
4. The candidates should be admitted at the SCHEDULED time and asked to dispossess themselves of any notes, note-book etc. The following instructions should be read to them before distribution of paper :
   (i) No candidate should leave his seat without permission.
   (ii) No candidate should have a direct communication with any other candidate.
   (iii) All important diagrams and electrical circuit diagrams should be drawn in the answer-book and connections should be shown to the examiner before performing the actual experiment.
   (iv) All important observations should be SHOWN to the examiner and get initialled otherwise it would be considered as FICTITIOUS.
   (v) Rubber should not be used. If an observation is to be changed the previous observation should be struck off and the new one entered and got initialled by the Practical Examiner.
   (vi) COOKING OF OBSERVATIONS IS A SERIOUS OFFENCE. IF COOKING IS ESTABLISHED NO CREDIT SHELL BE GIVEN FOR THAT EXPERIMENT.
   (vii) Marks must be deducted for lessor than the requisite number of readings taken for an experiment.
5. The following is the distribution of marks :

EXPERIMENT : 10+10 =	20 MARKS	GRAPH : 3+2 =	5 MARKS
VIVA VOCE :	3 MARKS	Prac. NOTE BOOK / Journal	2 MARKS
TOTAL MARKS = 30		PASS MARKS = 10	

6. The marks for a particular question should be entered in the column of that very question on the title page of the answer book and not in any other column.
7. Candidates should be asked to read the note at the top of the question paper. They are expected to mark TWO questions from each Section – I and II. Out of the questions thus marked the Examiner is expected to allot to the candidate ONE experiment from each section. While allotting experiments to the candidates the availability of apparatus in the laboratory may be kept in view. In case the apparatus for an experiment in the laboratory falls short or is not available, the Examiner is authorized to allot any other experiment for performance provided the experiment belongs to the same topic of syllabus and a note be given in answer book of the candidate invariably.
8. If a candidate is stuck, he may be put a few LEADING QUESTIONS but if he still fails to proceed, his experiment may be changed at his request. His award in the changed experiment should be REDUCED to 80% after giving note in the answer book.
9. " Special Instructions for the Examiners" have been prepared to provide a guide line to the Examiners for the sake of uniformity. It does not mean that the marking be made mechanical . " SPECIAL INSTRUCTION" for each experiments are divided into two categories. (i) Performance and Observations and (ii) Calculations and Result. For assessing the points mentioned under the heading

(Turn Over)

"Performance and Observations" the Examiner is expected to go to the seat of the candidate and see the confidence in the candidate with which he is performing the experiment. He should take into account the neatness, cleverness and dexterity at the practical work. The Examiner should put few questions to the candidate to know whether he understands the procedure of the experiment. While putting questions to the candidates the points mentioned under the bonding "Performance and Observations" should be kept in view. The Examiner should also check and sign some important observations taken by the candidates. Having done so the Examiner should award the marks to the candidate out of the total reserved for this category. The " Calculations & Result" should be assessed at home. The marks obtained by the candidate for these two categories should be awarded separately inside the answer book and the total marks obtained should be posted inside as well as in the appropriate column on the title page of the answer book. The following example will make the procedure clear :

Marking Formula	**P and O**	**+**	**C and R**	**=**	**T**	**Mark at the End of Answer of each Prac. Q.**
	4 (say)		3 (say)		7	

P and O stand for Performance and Observations, C and R stand for Calculations and Result and 'T' stands for Total.

10. Oral test should be confined to assess the candidate's general practical knowledge from all experiments of the prescribed syllabus.
11. The following points should be looked into while assessing the Note-Book :
    (a) that the candidate has performed at least 12 experiments;
    (b) that the work is spread over two years, the experiment are complete in all respects and duly signed;
    (c) Graphs are plotting in all possible cases;
    (d) Neat work should be acknowledged.
12. THE EXAMINER SHOULD NOT RUB OFF ANY AWARD. IF ANY AWARD IS TO BE CHANGED IT SHOULD BE STRUCK OFF SO THAT IT CAN STILL BE READ. ALL CHANGES MUST BE INITIALLED.
13. Absentees must be shown in the award-lists. Absentees are not to be counted as failures.
14. Answer books and award-lists should be sent to Board's Office on the same day by local examiners and within FOUR days of the last day of the examination by the Mufassil Examiners.
15. All railway and postal parcels should be pre-paid. The Railway Delivery Bill (way Bill) must be sent separately.
16. The counterfoils should be sent to the Controller of Examinations.
17. Absentees must also be shown in the forwarding memos and do not forget to send the forwarding memos along with award lists.
18. Different centuries of roll numbers should in no case be mixed in the award lists.
19. All corrections / cuttings in the award lists and in the Answer Books must be initialled / signed.
20. Word only should be written after an award ending in zero and before an award of less than ten.
21. Total marks on the title page of Answer Books must be recorded in words also.
22. The Examiner should ask questions for viva voce pertaining to the experiment given to the candidate.
23. Deduct 1 mark if units are not given.
24. As the number of reading for maximum marks are different for different experiment so the examiners are requested that they should announce the number of readings which the students has to take for the allotted experiments.
25. The examiners should also mark the answer sheet according to the marks distribution given in the special instruction.
26. The examiner should not write any thing under the heading link Roll Nos. on the award list.
27. The examines are asked to send the answer sheet after marking in an arranged pattern (Roll No. wise). The arrangement should be in accordance with the award list.

122358 II

Ans. Sheet 122346

(INTERMEDIATE)

PHYSICS
PRACTICAL

SPECIAL INSTRUCTIONS TO EXAMINERS

Note : Special instructions for all the experiments which have been for various group are given below. Examiners are expected to see the instruction of the relevant experiments from these sheets and evaluate the candidates strictly in the light of these instructions.

SECTION – I

EXPERIMENT # 1

VOLUME OF A SOLID CYLINDER USING VERNIER CALLIPER

Performance and observation :

1.	Determination of vernier constant	½
2.	Determination of zero error (±)	½
3.	Zero correction.	½
4.	Measurement of diameter solid cylinder at two perpendicular directions at three different places.	1
5.	Determination of length of solid cylinder at three different places.	1
6.	Determination of mean measurement.	½
		04

Calculation and result :

1.	Corrected value of radius of cylinder.	2
2.	Corrected value of length of cylinder.	2
3.	Formula for value of cylinder.	1
4.	Results.	1
		06

(Maximum Marks for 4 readings) 80% for 3, 60% for 2 in each case.

EXPERIMENT # 2

VOLUME OF A SMALL SPHERE USING A MICROMETER SCREW GAUGE

Performance and observation :

1.	Determination of least count and pitch of screw gauge.	1
2.	Determination of zero error and correction.	1
3.	Measurement of diameter of sphere at three different places twice at each places (one direct and other crossed)	2
		04

Calculation and result :

1.	Determination of radius of sphere by means of a micrometer.	3
2.	Formula for volume of sphere.	3
		06

(Maximum Marks for 4 readings) 80% for 3 , 60% for 2 in each case.

EXPERIMENT # 3

AREA OF CROSS SECTION OF A WIRE USING A MICROMETER SCREW GAUGE.

Performance and observation.

1.	Determination of least count and pitch of screw gauge.	1
2.	Determination of zero error and correction.	1
3.	Determination of radius of wire at three different places twice at each places (one direct and other crossed) by means of a micrometer	2
		04

Calculation and result :

1.	Determination of radius of sphere by means of a micrometer	3
2.	Formula for values of sphere.	3
		06

(Maximum Marks for 4 readings) 80% for 3 , 60% for 2 in each case.

(Turn Over)

EXPERIMENT # 4 :

UNKNOWN WEIGHT OF A BODY BY METHOD OF VECTOR ADDITION OF FORCES

Performance and observation :	
1. Making the board vertical	1
2. Sheet of paper fixed at with due consideration of the space for drawing figure	1
3. Weights hanging freely.	1
4. Disturb the suspended system slightly to see if it comes to the original position	1
5. Projection of the thread correctly marked.	2
	06

Calculation and result :	
1. Finding θ1 and θ2	1
2. Calculation for finding the result of two forces by rectangular components.	2
3. Finding the unknown weight	1
	04

(Maximum Marks for 3 readings) 90% for 2 , 60% for 1 reading

EXPERIMENT # 5 :

CONDITIONS FOR EQUILIBRIUM

(a) TWO LIKE PARALLEL FORCES.
(b) TWO UNLIKE PARALLEL FORCES

Performance and observation :	
1. Finding the C.G of meter rod.	1
2. Finding weight of meter rod.	1
3. Setting the apparatus.	1
4. Suspension of weight	1
5. Readings of spring balance for two like / unlike forces	1
6. Finding out the different distances.	1
	06

Calculation and result :	
1. Record for the unlike parallel forces	2
2. Finding out the differences.	2
	04

(Maximum Marks for 3 readings) 80% for 2, 60% for 1 reading.

EXPERIMENT # 6 :

VERIFICATION OF RELATIONS BY SIMPLE PENDULUM

(a) TIME PERIOD IS INDEPENDENT OF AMPLITUDE
(b) TIME PERIOD IS INDEPENDENT OF MASS.
(c) $T/\sqrt{l}$ (Time period / $\sqrt{\text{length}}$) = CONSTANT.

Performance and observation :	
1. Thread tightly clamped at the suspension.	½
2. Lower surface of two pieces of cork used for clamping the thread in the same horizontal plane.	½
3. The height of bob only a few centimeters above the floor	½
4. The two perpendicularly intersecting lines below the equilibrium point and position of the bob above the intersecting point in equilibrium position.	1
5. Measurement of length of the pendulum.	½
6. Small amplitude with vibration in a constant plane.	½
7. Measurement of diameter of bob with vernier calliper.	½
8. Measurement of time period of 20 vibrations.	1
	05

Calculation and result :	
1. Keeping same bob and length of pendulum.	1
2. Measurement of length of simple pendulum.	1
3. Calculation for time period for 20 vibrations.	1
4. Calculation of T.	1
5. Correct results.	1
	05

(b) Keeping length of pendulum constant :	
1. Measurement of length of pendulum	1
2. Measurement of correct masses of bobs (at least 4 bobs of different masses)	1
3. Measurement of time for 20 vibrations repeated twice for each mass.	1
4. Calculation of T.	1
5. Results	1
	05

(Continued)

(c) Keeping same bob, $T/\sqrt{l}$ = Constant.	
1. Measurement of correct length in each case (change length 4 times)	1
2. Calculation of $\sqrt{l}$	1
3. Measurement of time for 20 vibrations repeated for each length	1
4. Calculation of T	1
5. Result.	1
	05

(Maximum Marks for 4 readings) 90% for 3 , 80% for 2 and 60% for 1 reading)

EXPERIMENT # 7 :

TO STUDY CONSERVATION OF MOMENTUM BY COLLIDING TROLLEYS

Performance and observation :	
1. Oiling the wheels of carts.	1
2. Pressing the carts through metal plates and springs and fastening the hooks with loops of thread.	1
3. Proper contact of metal plates in a vertical plane.	1½
4. To adjust the position of the carts such that time of bumping to opposite bumpers becomes same.	1
5. Measurements of correct time of bumping.	1½
	06

Calculation and Results :	
1. Correct measurement of masses of carts.	1
2. Correct measurement of distances covered by carts in opposite directions	1
3. Momentum before and after releasing the carts.	1
4. Results	1
	04

(Maximum Marks for 3 readings) 80% for 2 , 60% for 1.

EXPERIMENT # 8 :

SURFACE TENSION OF WATER BY CAPILLARY RISE METHOD

Performance and observation :	
1. Knowledge of calculating the least count of the vernier calliper.	1
2. Setting up the apparatus for surface tension.	2
3. Calculating the height of H_2O in the capillary tube.	2
4. Putting the correct values in the formula.	2
5. Record , results with units.	3
	10

EXPERIMENT # 9 :

YOUNG'S MODULUS OF A WIRE BY SEARLI'S APPARATUS

Performance and observation :	
1. Length of experimental wire.	1
2. Mean dia of the experimental wire.	1
3. Area of cross section of the wire.	1
4. Pitch and least count of spherometer.	1
5. Initial reading of spherometer.	1
6. Spherometer reading when wire is loaded with 3 kg load.	1
7. Extension of 3 kg load.	1
8. Record and results with units.	3
	10

EXPERIMENT # 10 :

VELOCITY OF PERIODIC WAVES BY RIPPLE TANK

Performance and observation :	
1. Adjust of straight rod in horizontal direction.	1
2. Suitable speed of the motor generating waves.	1
3. Proper arrangement of light for bright image of crest on screen	1
4. Recording frequency of waves.	1
5. Correct measurement of wave-length.	1
	05

(Turn Over)

CALCULATION AND RESULTS

1.	Measurements of time for 30 vibrations.	1
2.	Measurements of frequency of waves.	1
3.	Measurements of wave-length.	1
4.	Formula for velocity of waves.	1
5.	Result	1
		05

EXPERIMENT # 11 :

FREQUENCY OF A.C MAIN BY MELDE'S EXPERIMENT

Performance and observation :

1.	Setting up of steel strip into vibrations that thread with a suitable weight in pan vibrates in one loop.	1½
2.	Adding suitable weights in pan to force thread to vibrate in more than one loop.	1½
3.	Correct measurement of length of loops.	1
4.	Calculation of mass per unit length of loop.	1
		05

Calculation and Result :

1.	Measurement of no. of loops.	½
2.	Measurement of distance between extreme nodes.	½
3.	Length of each loop.	½
4.	Calculation of tension, that is mass of the pan and the mass added to it X 'g' i.e. T=mg	1
5.	Formula	1½
6.	Result	1
		05

EXPERIMENT # 12 :

LAW OF VIBRATION OF STRECHED STRINGS

(A) Law of Length $(v \propto \frac{1}{l})$

Performance and observations :

1.	Testing the pulleys for no friction.	1
2.	Stretching the wire without kinks on the sonometer.	1
3.	Free suspension of hanger with allotted weights.	1
4.	Proper striking of the tuning forks and proper placing of the tuning forks.	1
5.	Keeping the stretching force constant.	1
6.	Finding resonance with one tuning fork (twice) & measuring 'l'	1
7.	Finding resonance with second fork (twice) and measuring 'l'	1
		07

Calculation and Result :

1.	Record.	1
2.	Verification of the law $v \alpha l$ = Constant	1
3.	Result	1
		03

(Maximum Marks for 2 readings) 75% for 1, reduce the award to 50% if one tuning fork is used. Total marks = 10 .

(B) Law of tension $v \alpha T^{1/2}$ or $v / T^{1/2}$ = Constant

Performance and observations.

1.	Testing the pulleys for no friction.	1
2.	Stretching the wire without kinks on the sonometer.	1
3.	Free suspension of hanger with allotted weights.	1
4.	Proper striking of tuning fork.	1
5.	Keeping length 'l' constant.	1
6.	Finding resonance with tuning fork	1
7.	Noting of tension and frequency	1
8.	Repeating the experiment with another tuning fork.	1
		08

Calculation and Result :

1.	Record.	½
2.	Proof of the law $v / T^{1/2}$ = Constant	1
3.	Result	½
		02

(Maximum Marks for 2 readings) 75% for 1, reduce the award to 50% if one tuning fork is used.

(Continued)

EXPERIMENT # 13 :

(A) VELOCITY OF SOUND USING FIRST RESONANCE POSITION AND END CORRECTION

Performance and observations :

1.	Vertically of resonance tube	½
2.	Proper striking of tuning fork.	½
3.	Proper holding of tuning fork.	½
4	Obtaining the position of resonance with water level falling and then rising and then taking mean	1
5.	Noting the reading of water with two squares.	1
6.	Temperature of air in the tube before and after the experiment (room temperature)	½
7.	Measurement of diameter of the resonance (twice)	1
		05

Calculation and Result :

1.	Record	½
2.	Calculation of resonant length.	1
3.	Correct formula with end correction applied.	1
4.	Calculation of velocity of sound at room temperature.	1
5.	Calculation of velocity of sound at 0 °C	1
6.	Results.	½
		05

Maximum Marks for using 2 tuning forks and taking 2 observations with each tuning fork, 80% for 1 reading, reduce award to 50% if one tuning fork is used.

(B) Velocity of sound using two resonance positions.

Performance and observations :

1.	Vertically of resonance tube.	½
2.	Proper striking of tuning fork	½
3.	Proper holding of tuning fork	½
4.	Obtaining the position of resonance with water level falling and then rising and then taking mean.	1
5.	Obtaining the position of 2nd resonance with level falling and then raising (twice) and taking mean.	1
6.	Noting the reading of water level with set squares.	1
7.	Room temperature before and after experiment.	½
		05

Calculation and results :

1.	Record	½
2.	Calculation of resonant length.	1
3.	Correct formula with end correction applied	1
4.	Calculation of velocity of sound at room temperature	1
5.	Calculation of velocity of sound at 0 °C	1
6.	Results.	½
		05

Maximum Marks for using 2 tuning forks and taking 2 observations with each tuning fork, 80% for 1 reading, reduce award to 50% if one tuning fork is used.

EXPERIMENT # 14 :

STUDY OF VARIATION OF DEPTH WITH REAL DEPTH OF TRANSPARENT SUBSTANCE USING MICROSCOPE AND HENCE CALULATE THE REFRACTIVE INDEX OF THE MEDIUM.

Preference and observations :

1.	Determination of water constant of travelling microscope.	½
2.	Marking of the cross (a point) and fixing it on a plane, level surface.	½
3	Focusing of microscope for different readings.	2
		03

(Turn over)

Calculation and results :

1. Microscope reading for cross (or point) 1 and with glass slab (ii)	1
2. Microscope reading for surface of slab (iii)	1
3. Measurement of real depth (iii-i)	1
4. Measurement of apparent depth (iii-ii)	1
5. Formula for refractive index.	1½
6. Result.	1½
	07

EXPERIMENT # 15 :

FOCAL LENGTH OF CONVEX LENS BY DISPLACEMENT METHOD

Performance and observations :

1. Appropriate focal length of convex lens.	1
2. Index correction for two needles.	1
3. Removal of parallel at two different places.	2
4. Regular variation in P.	1
5. Measuring I and d	1
	06

Calculation and Result :

1. Correcting d for index error.	1
2. Record	1
3. Calculation of F	1
4. Result.	1
	04

(Maximum Marks for 4 readings) 80% for 3 , 50% for 2.

EXPERIMENT # 16 :

FOCAL LENGTH OF CONVEX LENS BY HELP OF CONCAVE MIRROR

Performance and observations :

1. Determination of Appropriate focal length of concave mirror.	1
2. Determine of index correction for mirror, needle, and lens.	1
3. Placing convex lens at proper place between concave mirror and object.	1
4. Removing parallax at different steps.	2
	05

Calculation and Result :

1. Determination of radius of curvature R of concave mirror.	1
2. Determination of p and q after index correction.	2
3. Formula for focal length.	1
4. Results.	1
	05

(Maximum Marks for 4 readings) 80% for 3 , 60% for 2 and 40% for 1

EXPERIMENT # 17 :

CRITICAL ANGLE OF GLASS USING GLASS PRISM.

Performance and observations :

1. Boundary of prism.	½
2. Fixing object pins.	½
3. Locating the emergent ray when the image of the object pin just begins to disappear.	1½
4. Pins, vertical in line with the image and well apart.	½
	03

Calculation and Result :

1. Ray construction through the prism.	2
2. Measurement of critical angle.	2
3. Obtaining mean values of critical angle.	1
4. Calculation of refractive index.	1
5. Result	1
	07

(Maximum Marks for 4 readings) 80% for 3 , 60% for 2 and 40% for 1

(Continued)

EXPERIMENT # 18 :

REFRACTIVE INDEX OF A LIQUID USING A CONCAVE MIRROR

Performance and observations :

1. Appropriate focal length of concave mirror.	½
2. Horizontal needle at vertical height of twice the focal length of concave mirror.	½
3. Removing parallax with and with-out liquid in mirror.	1½
4. Correct measurement of distance (heights)	½
	03

Calculation and Result :

1. Measurement of vertical distance between surfaces of liquid and needle before removing parallax.	2
2. Measurement of vertical distance between surfaces of liquid and needle after removing parallax.	2
3. Formula for refractive index of liquid.	2
4. Result	1
	07

Maximum marks for using two concave mirrors. Reduce award to 50% if one concave mirror is use.

EXPERIMENT # 19 :

ANGLE OF PRISM BY A SPECTROMETER

Performance and observations :

1. Setting the spectrometer.	1
2. Placing the prism on the turntable properly.	1
3. Receiving the reflected light on the face of the prism and noting the position of the vernier after removing the parallax between the slit edge and telescope cross wire.	1
4. Receiving the reflected light on the other face of the prism and noting the position of the vernier after removing the parallax between the slit edge and telescope.	1
5. Placing the prism of turntable for minimum deviation.	1
6. Finding the position for direct light.	1
7. Locating the position for minimum deviation.	1
	07

Calculation and Result :

1. Record.	½
2. Calculating the angle of prism between the two faces.	1
3. Note the angle of prism, angle of minimum deviation.	1
4. Result.	½
	03

(Maximum Marks 2 readings) 80% for 1

EXPERIMENT # 20 :

WAVELENGTH OF SOLID MEDIUM BY NEWTON'S RINGS.

Performance and observations :

1. Setting the apparatus.	1
2. Finding the Newton's rings.	2
3. Setting the travelling microscope on the left side of the ring and noting the reading.	½
4. Setting the travelling microscope on the right side of the ring and noting the reading.	½
5. Noting diameter of ring.	1
6. Finding the radius of curvature of the lens.	1
	06

Calculation and Result :

1. Record.	1
2. Correct formula.	1
3. Calculation of λ	1
4. Result.	1
	04

(Maximum Marks for 3 readings) 80% for 2 and 60% for 1.

EXPERIMENT # 21 :

WAVELENGTH OF SODIUM LIGHT BY DIFFRACTION GRATING

Performance and observations :

1. Setting of telescope for infinity.	½
2 Setting of telescope and collimeter in line.	½
3 Making the collimeter slit symmetrical levelling screws	½
4 Noting the reading of both vernier scale.	½

(Turn Over)

5. Turning the telescope to 90°	½
6. Turning the grating till light falls on its backside	½
7. Turning grating perpendicular to incident light.	½
8. Seeming direct image of slit.	½
9. Reading the first order spectrum on one side, then on the other side.	½
10. Taking similar reading for 2nd order spectrum	½
	05

Calculation and Result :

1. Record	1
2. Calculation of grating element	1
3. Correct formula	1
4. Calculation of wavelength	1
5. Result	½
6. Angstrom units	½
	05

Maximum Marks for 2 readings and 80% for 1 reading

EXPERIMENT # 22 :

SETTING UP A COMPOUND MICROSCOPE AND DETERMINATION OF ITS MAGNIFYING POWER

Performance and observations :

1. Approximate focal length of eyepiece and objective	1
2. Removing of parallax	2
3. Marking of cross mark (object) clearly.	1
4. Placing object (cross mark) near focal point of objective.	1
	05

Calculation and Result :

1. Measurement of foal length of eyepiece by parallax method	2
2. Measurement of p and q	1
3. Formula for magnifying power.	1
4. Result	1
	05

EXPERIMENT # 23 :

MECHANICAL EQUIVALENT OF HEAT (BY ELECTRICAL METHOD)

1. Circuit diagram.	1
2. Mass of H_2O in the calorimeter.	1
3. Values of current and potential difference.	1
4. Rise of temperature record.	1
5. Time for which current is passed.	1
6. W = JH	1
Where : J = W / H = Vit / H	1
H = mCΔT	1
7. Record , result with units.	2
	10

EXPERIMENT # 24 :

MOMENT OF INERTIA OF FLY WHEEL

1. Mean radius of the axle.	1
2. Mass suspended.	1
3. No. of turns of thread on the axle.	1
4. Record of no. of rotations of the fly wheel before it comes to stop.	1
5. Record of time taken by the wheel before it comes to rest	1
6. Record of height of fall of the weight suspended with the axle.	1
7. Correct formula	1
8. Record and calculation.	3
	10

EXPERIMENT # 25 :

VALUE OF 'g' BY TIMER (ELECTRONICS)

1. Setting up the apparatus	3
2. Record of the time of the bob to strike the gate plate	1
3. Putting the value of the t and S in the formula	1
4. Calculation, result & united (for six readings.)	5
	10

EXPERIMENT # 25 A :

VALUE OF 'g' BY oscillating mass spring system

1. Setting up the apparatus.	3
2. Proper lifting and releasing the weight.	1
3. Correct record of pointer position.	1
4. Calculation and result.	5
	10

(Continued)

EXPERIMENT # 26 :

DIAMETER OF A WIRE BY LASER

1. Setting the apparatus	3
2. Measurement θ diffraction angle for 1st, 2nd, and 3rd order spectrum.	3
3. Calculating the result from the record.	4
	10

EXPERIMENT # 27 :

FALL OF BODY THROUGH VISCOUS MEDIUM AND CALCULTION OF CO-EFFICIENT OF VISCOSITY OF THE MEDIUM.

1. Make the tube vertical.	1
2. Wetting of bob with liquid used.	1
3. Measure the radius of steel ball.	1
4. Measurement of distance between two points.	2
5. Noting the time taken.	1
6. Finding the terminal velocity : a. $V_t = S / t$	2
7. Calculation of co-efficient of viscosity i. $\eta = 2r^2(\sigma_s - \sigma_l) / 9V_t$ Where σ_s = density of steel ball, σ_l = density of liquid used.	2
	10

Maximum Marks for 4 readings, 80% for 3 reading, 60% for 2 and 40% for 1 reading

SECTION – II

EXPERIMENT # 28 :

SPECIFIC RESISTENCE OF A WIRE BY SLID WIRE BRIDGE.

Performance and observations :

1. Circuit diagram (shown to examiner.)	1
2. Correct connections.	2
3. Obtaining the null point and always shifting it to somewhere near the middle of the bridge wire.	1
4. Measure of length and diameter of wire.	1
5. Formula used.	1
	06

Calculation and Result :

1. Calculation of resistance.	1
2. Calculation of specific resistance.	1
3. Result with unit.	2
	04

Maximum Marks for 4 Obs., 80% for 3 reading, 60% for 2

EXPERIMENT # 29 (A) :

RESISTANCE OF GALVANOMETER BY HALF DEFLECTION METHOD

Performance and observations :

1. Circuit diagram (shown to examiner.)	1
2. Correct connections.	2
3. Taking out suitable resistance from resistance box to get even number deflection within the scale.	1½
4. Suitable resistance taken out from the shunt resistance box to make the deflection half.	1½
	06

Calculation and Result :

1. Calculation of (R –S) and (R × S)	2
2. Graph between (R –S) and (R × S)	2
	04

Maximum Marks for 4 Obs., 80% for 3 and 60% for 2

(Turn Over)

EXPERIMENT # 29 (B) :

RESISTANCE OF GALANOMETER BY HALF DEFLECTION METHOD (CURRENT FOR FULL SCALE)

Performance and observations :

1. Step (i) and (iii) as in A. — 4
2. Measurement of e.m.f. 'E' of the cell by voltmeter. — 1
3. Resistance from the main circuit resistance box to get full scale or 20 deflection in the galvanometer Rg. — 1

Total: 06

Calculation and Result :

1. Calculation of resistance of galvanometer — 2
2. Current required for full scale deflection $I_g = \frac{E}{R_g + G}$ — 2

Total: 04

Maximum Marks for 4 Obs., 80% for 2 and 60% for 1

EXPERIMENT # 30 :

INTERNAL RESISTANCE OF A CELL. by using potentiometer

Performance and observations :

1. Circuit diagram. — 1
2. Correct connections. — 2
3. Closing K_1 and to find the balance point three times. — 1
4. Measurement of length ℓ in each case. — 1
5. Closing K_2 and to find the balance point with R = 5, 10, 15, 20, 25 Ohms or so in each case. — 1

Total: 06

Calculation and Result :

1. Formula used. — 1
2. Calculation of internal resistance. — 2
3. Result with unit. — 1

Total: 04

Maximum Marks for 5 Obs., 80% for 3 and 60% for 2 and 40% for 1.

EXPERIMENT # 31 :

RESISTANCE OF A VOLTMETER

Performance and observations :

1. Circuit diagram. — 1
2. Correct connections. — 2
3. Measuring EMF of cell / battery and taking it equal to maximum voltmeter reading. — 1
4. To take out R = 200 Ohms or so from R. box and to note deflection of voltmeter. — 1
5. To repeat the above step five times more by increasing R in regular steps. — 1

Total: 06

Calculation and Result :

1. Calculation of 1/V for each obs. — 1
2. Graph between R and 1/V producing line backward and to find the resistance of voltmeter from the intercept. — 2
3. Result with unit. — 1

Total: 04

Maximum Marks for 6 Obs., 80% for 4 and 60% for 3.

EXPERIMENT # 32 :

RELATION BETWEEN THE CURRENT PASSING THROUGH A TUNGSTEN FILAMENT LAMP AND P.D. APPLIED ACROSS IT.

Performance and observations :

1. Circuit diagram. — 1
2. Correct connections. — 2
3. Reading of voltmeter and ammeter. — 2
4. Regular variation of voltage. — 1

Total: 06

(Continued)

Calculation and Result :

1. Graph between V and I. — 2
2. Explanation of the shape of the graph. Temp. increases ∴ ohm law does not obey. — 2

Total: 04

Maximum Marks for 6 Obs., 80% for 5 and 60% for 4 .

EXPERIMENT # 33 :

RELATION BETWEEN CURRENT AND CAPACITY , WHEN DIFFERENT CAPACITORS ARE USED IN A.C. CIRCUIT

Performance and observations :

1. Circuit diagram. — 1
2. Correct connections. — 2
3. Noting the capacitance of a capacitor and reading of A.C. millimeter. — 1
4. Repeating the experiments 5 times more with capacitors of different capacitance. — 2

Total: 06

Calculation and Result :

1. Calculating I /C — 1
2. Graph between I and C. — 2
3. Result. — 1

Total: 04

EXPERIMENT # 34 :

STUDY THE VARIATION OF PHOTOELECTRIC CURRENT WITH INTENSITY OF LIGHT using photo cell



Performance and observations :

1. Circuit diagram. — 1
2. Correct connections. — 2
3. Noting the distance d and galvanometer deflection. — 1
4. Repeating the above step by decreasing d in regular steps till d = 10 cm — 2

Total: 06

Calculation and Result :

1. Calculating $1 / d^2$ — 1
2. Graph between $1 / d^2$ and I — 2
3. Inference. — 1

Total: 04

EXPERIMENT # 35 :

TO PLOT A MAGNETIC FIELD DUE TO CURRENT IN A CIRCULAR COIL

Observations and calculations :

1. Circuit diagram. — 1
2. Setting the direction of the coil along the magnetic meridian by means of campass needle. — 1
3. Making the connections of the coil. — 2
4. Making of the magnetic lines of forces at the centre of the coil and also near the ends of the coil. — 1
5. Note number of turns of coil, current I and radius of the coil. — 1

Total: 06

Calculation and Result :

1. Diameter and radius of coil. — 1
2. Current through coil. — 1
3. Field strength and its unit formula. — 1
4. Formula used. — 1

Total: 04

EXPERIMENT # 36 :

CALCULATION OF RESISTANCE OF THERMISTOR WITH TEMPERATURE.

Performance and observations :

1. Circuit diagram. — 1
2. Correct connections — 2
3. Record temperature in 0 °C — 2
4. Record for temperature in T (Kelvin) — 1

Total: 06

(Turn Over)

Calculation and Result :

		Marks
1.	Graph between temperature in Kelvin along x-axis and resistance of thermistor along y-axis.	2
2.	Slope of graph $\frac{\Delta R}{\Delta T}$	1
3.	Result	1
		04

EXPERIMENT # 37 :
CONVERSION OF GALVANOMETER INTO AMMETER.

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Correct and neat tight connections.	2
3.	Taking out suitable resistance for even number.	1
4.	Record for half deflection.	2
		06

Calculation and Result :

		Marks
1.	Calculation for galvanometer resistance.	1
2.	Calculation for shunt resistance connection in parallel to galvanometer.	1
3.	Calculation of Ig.	1
4.	Verification.	1
		04

EXPERIMENT # 38 :
CONVERSION OF GALVANOMETER INTO VOLTMETER

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Correct ,neat and tight connections.	2
3.	Taking out suitable resistance for even deflection.	1
4.	Record for half deflection.	2
		06

Calculation and Result :

		Marks
1.	Calculation for resistance of galvanometer	1
2.	Calculation Ig	1
3.	Calculation for high resistance connected in series with galvanometer.	1
4.	Verification.	1
		04

EXPERIMENT # 39 :
EMF OF CELL BY POTENTIOMETER

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Correct connections.	2
3.	Location of balance point.	1
4.	Measurement of e.m.f. by voltmeter (E)	1
5.	Formula used.	1
		06

Calculation and Result :

		Marks
1.	Calculation of e.m.f. (Ex)	2
2.	Actual value of Ex	1
3.	Calculation of % error.	1
		04

EXPERIMENT # 40 :
CHARACTERISTICS OF SEMI CONDUCTOR DIODE.

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Correct ,neat and tight connections.	2
3.	Check zero correction for measuring instruments.	1
4.	Adjustment of rheostat for minimum reading.	1
5.	Record of voltage and current.	1
		06

(Continued)

Calculation and Result :

		Marks
1.	Graph between V and I for forward biased or reversed biased.	3
2.	Inference.	1
		04

EXPERIMENT # 41 :
CHARACTERISTICS OF TRANSISTOR

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Tight, neat and correct connections.	2
3.	Check zero correction for measuring instruments.	1
4.	Record	2
		06

Calculation and Result :

		Marks
1.	Graph between V and I (input curve)	2
2.	Graph between V and I (output curve)	2
		04

EXPERIMENT # 42 :
VERIFY TRUTH TABLE OF LOGIC GATES

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Tight, neat and correct connections.	2
3.	Check the working of indicating lamp.	1
4.	Write the truth table.	2
		06

Calculation and Result :

		Marks
1.	Logic operation.	2
2.	Result.	2
		04

EXPERIMENT # 43 :
HIGH RESISTANCE BY NEON FLASH LAMP.

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Neat, tight and correct connections.	2
3.	Check that applied voltage should be constant and greater than striking voltage of Neon flash lamp.	1
4.	Record.	2
		06

Calculation and Result :

		Marks
1.	Graph between unknown resistance and flashing period.	2
2.	Result.	2
		04

EXPERIMENT # 44 :
E / M OF ELECTRON

Performance and observations :

		Marks
1.	Circuit diagram.	1
2.	Correct, tight and neat connections.	2
3.	Measurement of length, number of turns and radius of coil.	1
4.	Measurement of curvature of edge of shadow.	1
5.	Record.	1
		06

Calculation and observations :

		Marks
1.	Calculation of e / m.	2
2.	Correct value of e / m and unit.	2
		04

(Turn Over)

EXPERIMENT # 45 :

Set up Burglar alarm using 'NAND' gate.

Performance and observations :

1. Circuit diagram. 1
2. Tight, neat and correct connections. 2
3. Check the working of Burglar alarm. 1
4. Write the observation table. 2

06

Calculation and Result . 4

EXPERIMENT # 46 :

Make a fire alarm using NOT gate

Performance and observations :

1. Circuit diagram. 1
2. Tight, neat and correct connections. 2
3. Check the working of fire alarm. 1
2. Write the observation table. 2

06

Calculation and Result. 4

EXPERIMENT # 47 :

Value of 'g' by free fall method using an electronic timer

Performance and observations :

1. Setting the circuit. 2
2. Measuring the distance 2
3. Press and release button of the electronic timer 2

06

Calculation and Result .

1. Record on table 2
2. Calculation of 'g' using formula 2

04

Maximum Marks for 4 readings, 80% for 3 , 60% for 2 and 40% for 1